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THE PURPOSE AND PLAN OF AN ECONOMIC BASE SURVEY OF THE COLORADO RIVER BASIN

Public Health Service
Denver, Colorado

January 1963

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THE PURPOSE AND PLAN OF AN ECONOMIC BASE SURVEY OF THE COLORADO RIVER BASIN

U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service
Division of Water Supply and Pollution Control
Region VIII
Denver, Colorado

Colorado River Basin Water Quality Control Project
January 1963

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PREFACE

This report is a revision of an earlier Project report entitled Discussion of an Economic Base Study for the Colorado River Basin Water Quality Control Project, May 8, 1961. It is being reissued in order to serve as an up-to-date source of information in regard to the role of economic base survey activities in the overall Project effort.

The economic base survey of the Colorado River Basin provides an analysis of the economic characteristics, developments, and trends of the past, and a projection of future economic growth in view of the area's basic available resources. The economic base survey in turn provides the basis for development of a water quality management program for the study area. In order to understand the role of the economic base survey, however, one must first understand the purpose and magnitude of the water quality management program.

A water quality management program consists of a series of alternative plans for regulating the quantity and quality of the water resource of a study area in order to serve a combination of present and future legitimate water uses. These plans differ from one another, depending upon the kind and magnitude of future economic development expected under differing assumptions in regard to factors affecting this development. For example, in one case it may be assumed that irrigated agriculture will be a major section of the economy; in another case, it may be assumed that its importance will decline as urban sectors of the economy expand.

Since projecting the future deals in the realm of uncertainty, several alternative growth paths are needed. These in turn are based on varying assumptions in regard to growth of individual sectors of the local economy - agriculture, mining, manufacturing, and the like. When a series of these projections are used for developing a series of water quality management plans, and then assembled into an overall water quality management program report, the end product may serve as a guide to those entities - Federal, state, and local - who have an interest in and/or responsibility for water resources management.

The development of an economic base survey, including several alternative growth paths, must be developed in line with a number of specifications if it is to be used in preparing a water quality management program. Among these are: 1) Flexibility; 2) Comprehensive coverage of all sectors of the economy; 3) Orientation to the natural drainage basin under study; and 4) Coverage of the same projected time span as the water quality management program. The effects of these specifications on the suitability of using presently available economic reports for the Colorado River Basin area in developing the Project's economic base survey effort are discussed in turn:

1. Flexibility

Typical economic base surveys prepared in conjunction with most development programs, such as plans for construction of an irrigation reservoir, are rigid in nature. They do not take into account all the various ways in which water resources may be utilized. The water quality management program effort, however, is geared to providing a basis for comparing benefits for a number of alternative ways in which water can be used and the economic base survey provides the means for making this comparison. Within the Colorado River Basin study, an inter-industry input-output approach is being used as the mechanism for carrying out this objective. 1/

2. Comprehensive Coverage of All Sectors of the Economy

A number of economic surveys covering limited portions of the Colorado River Basin have been made in the past by various Federal, state, and local agencies. These studies are extremely valuable in the development of the Project's economic base survey effort but they cannot serve as the only source of basic information. In most cases, these available studies were prepared in conjunction with water development efforts limited to a small number of project purposes such as irrigation, power, and recreation. The overall economy and the effect of the proposed project on the nonproject sectors of the economy are not fully taken into account; for example, the probable off-setting effects that may occur if other sectors of the economy -- say, manufacturing or transportation -- develop at a different rate than they have in the past. The Project's economic base survey is taking all sectors of the present and future economy of the Colorado River Basin into consideration, both in terms of the direct impact on each sector of the economy affected and the interrelationships involved when these individual sectors are considered as part of the overall economy.

3. Orientation to the Natural Drainage Basin

The Project's economic base survey will be subdivided by counties and by six major sub-basins of the Colorado River Basin. Studies available from other agencies do not coincide with the Project's level of breakdown - they may be limited to the counties involved in a single development project or in some cases include consideration of area outside of the Colorado River Basin. Even when a number of these studies deal with selected counties within the Basin, they cannot simply be

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1/ For a discussion of the input-output approach, refer to: K. C. Nobe and George G. Collins, A Preliminary Economic Study of the Animas-La Plata Pilot Project Watersheds in the Four Corners Area of the Colorado River Basin, ER-1, Colorado River Basin Water Quality Control Project, U. S. Public Health Service, Denver, Colorado, July 1962, pp. 5-15 and 150-154.

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added together because the resulting projections would likely be greater than if the study areas involved were considered simultaneously. The reason for this can be illustrated with an example: Assume that there are enough timber resources available in the Green River Sub-Basin to support one pulp mill. If separate studies were made of three counties where a mill could conceivably be located, and it was concluded that such a mill would be built in each of the counties under consideration in the three individual studies, simply adding the results of these studies would result in a projection of three pulp mills in the Green River Sub-Basin. In the Project's approach, however, the relative merits of the three potential sites would be considered simultaneously and the projection would likely include only one pulp mill, with the three potential sites listed in order of probability. Thus, it should be apparent that available economic studies of individual areas within the Colorado River Basin are valuable to the Project's effort but that they cannot be used as a substitute for a separate overall economic base survey.

4. Orientation to the Projection Period of the Project Effort

Probable future economic developments during the 1960 - 2010 period are under consideration in developing the water quality management program for the Colorado River Basin. This specification places a severe limitation on the usefulness of available economic reports prepared by other agencies for portions of the Colorado River Basin. Depending upon the objectives of the agency preparing the report, such studies may contain projections for periods ranging from 5 to 100 years into the future. A part of the Project effort will involve utilizing the results of such studies by modifying the expected future developments as affected by consideration of a 50-year projection period.

The overall basinwide economic projections which are being developed by the Colorado River Basin Water Quality Control Project will perhaps be no more reliable than those prepared by others for specific study areas within the Colorado Basin. They will, however, contain an ingredient of flexibility -- an attribute which has been lacking in available studies to date. This alone is a great step forward because it allows for continual updating and improvement of the projections as new and more detailed data become available. In other words, unforeseen developments which will alter or otherwise affect the water use pattern, can be incorporated into the projections at any time without expensive and time-consuming detailed restudy. This attribute is a prime prerequisite for economic base studies carried out in conjunction with water quality management planning which by necessity is a never-ending process.

Kenneth C. Nobe
Chief, Economic Studies

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THE PURPOSE AND PLAN OF AN ECONOMIC BASE SURVEY OF THE COLORADO RIVER BASIN

by

Kenneth C. Nobe

INTRODUCTION

The Surgeon General of the U. S. Public Health Service called a conference in Phoenix, Arizona on January 13, 1960, at the request of the water pollution control agencies of the seven states in the Colorado River Basin. The purpose of this conference, held under the provisions of section 8 of Public Law 660, 84th Congress, was to consider the interstate pollution of the Colorado River and its tributaries. The conferee group consisted of representatives of the water pollution control agencies of the seven Basin states - Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming, and the Regional Program Director, Water Supply and Pollution Control, Public Health Service, Denver, Colorado. Representatives of various interested Federal, state, and local agencies, and industry also attended.

The material presented at the conference indicated that further investigation and study was needed to define the type of interstate pollution problems which now exist or may reasonably be expected to exist in the future. As a result, the U. S. Public Health Service was requested to undertake the Colorado River Basin Water Quality Control Project. The conference reconvenes annually to consider the current findings of the Project. Project operations in the 244,000 square mile drainage area were started in July 1960. It is estimated that it will take approximately 6 years to complete the study.

PROJECT OBJECTIVES

The project is organized into two broad categories having the following objectives:

1. A determination of the specific pollutants and their concentrations which now exist or which may reasonably be expected to exist in the immediate future resulting from various water uses within the Basin and the establishment of priorities for developing data on, and securing needed remedial action at the most critical and pressing problem areas.

2. A determination of methods for securing the best possible water quality for multiple water use and the development of a comprehensive plan and program of water quality control

for multiple water use within the Basin which can serve as a guide for the conference and to state and Federal agencies having an interest in the prevention and control of water quality degradation.

These two principal objectives of the Project are closely interrelated and activities undertaken to satisfy either objective complement the other. The first phase of the survey is directed to determination of the most critical immediate pollution problems so that expeditious remedial action through the conference mechanism or by individual states may be initiated. Concurrent with this phase activities are also underway to provide basic information for the preparation of a long-range water quality management program for the Basin.

IMPORTANCE OF AN ECONOMIC BASE SURVEY

An overall economic base survey is a prime prerequisite to the preparation of a water pollution control program for the Basin. Such a program must reflect not only present economic conditions but those expected and desired to prevail for the period of analysis as well--in this case to the year 2010. It becomes the key component in long range planning because it defines the growth path and the time sequence for which the program is designed.

The conventional benefit-cost analysis is applied under present day considerations of water development projects undertaken by other Federal agencies. This approach assumes some precise way in which future benefits and costs accrue. The sequence of time for accrual of benefits affect in turn the discounted value of average annual benefits. This expected sequence in time for economic development (and its relation to water quality), resulting from these anticipated projects, must also be taken into account in the water quality management program that the Public Health Service will develop.

Although projection theory and practice inherent in economic base studies are still crude and beset with limitations, the developed data from such a study will need to be assumed as reasonably precise for the purpose of formulating a water quality management program for the Basin. The economic base survey, therefore, must contain sufficient qualifications to indicate that these appearances of precisions (designed solely for planning purposes) are not to be interpreted as certainties and therefore reliable indicators of short-run situations.

The purpose, then, of an economic base survey of the Colorado River Basin is to provide an analysis of the economic characteristics, developments, and trends of the past, and a projection of future growth and needs of the study area. It must identify and measure, insofar as practicable, the economic, social, physical, geographical, and technological factors relevant to economic development and growth

in the Basin. Estimates of the expected time pattern of changes and development of economic conditions, both with and without water resource developments and pollution control measures under consideration, are needed in order to constitute a framework within which a water quality management program is formulated.

The need for water of given quantity and quality is directly dependent upon the extent and types of economic activity within the Basin and the size of its population. In this respect, however, it is not expected that the economic base survey will indicate directly the pattern of future water use. Rather, the base survey should provide the economic dimensions in such units that Colorado River Project personnel can readily interpret them in terms of future water quality and quantity requirements. Without the economic data in this form, it would be impossible to develop a meaningful water quality management program for the Basin.

USE OF THE ECONOMIC REPORT AS A PLANNING TOOL

Following completion of the economic base survey, it will be necessary to translate the physical units of production attributable to the basic producing sectors of the projected economy into pollution loadings under assumed treatment conditions. Separate calculations are required for each projected growth path because the number and magnitude of individual sectors of the economy included in each will differ in their effect on in-stream water quality. The cumulative effects on downstream uses will then be determined in relation to desired water quality objectives.

A number of alternative water quality management plans, coordinated with alternative economic growth paths for the study area, can thus be combined into a single water quality management program. By use of the economic model for each situation, the relative merits of each alternative plan can be ascertained by referring to the total economic activity generated in each case 1/ This will result in a practical application of the "optimum total welfare" concept to planning for water quality management.

Economic analysis within this framework provides the basis for indicating both the relative "costs" of the alternative plans offered for consideration and the relative "returns" that can reasonably be expected if a particular plan is put into effect. Unless data on both costs and benefits are provided in this manner, no intelligent choice among alternative plans can be made. Herein lies the importance of the economic base survey in the overall Project effort.

1/It will be desirable to program the basic economic input-output model for rapid data machine processing since a number of approximations of the probable economic growth path will be required when developing water quality management programs for the various sub-basins in the Colorado River Basin.

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REQUIREMENTS AND LIMITATIONS OF THE ECONOMIC BASE SURVEY

All aspects of the economic base survey are to be included in a single report by the agency or group carrying out the study. This, however, does not limit subcontracting certain segments of the study, provided the data obtained in this manner are incorporated into the overall report. Within this framework, arrangements have been made to assign overall responsibility for the economic base survey report to the Associated Rocky Mountain Universities, Inc. This agency in turn has subcontracted with a number of member universities, and in addition is incorporating data on the agricultural segment which is being developed by the Economic Research Service of the U. S. Department of Agriculture.

The findings of the Senate Select Committee on National Water Resources highlight the expected magnitude of our water resource problems by 1980 and 2000. They point out that the Colorado River Basin is one of five major river basins in the nation where full development of the available water resources is needed by 1980. In addition, it was pointed out that even with full development, the expected demand generated by possible economic growth in the Colorado River Basin could not be met. In other words, there will be strong competition among various segments of the Basin's future economy for a share of a limited water supply. Therefore, the economic base survey of the Colorado Project must indicate the totality of economic growth resulting from various alternative combinations of the sectors of the economy that could conceivably develop within this Basin in the future. An analysis of these alternative combinations should indicate also the extent to which water law and other institutional constraints may be controlling or modifying factors.

Basic Concepts of Projections

The following are suggested as basic axioms for formulating long-term projections of economic conditions in the Colorado River Basin:

1. A long-term projection is fundamentally an estimate of probabilities in light of past trends, selection of major guiding forces, and identification of probable future modifying conditions.

2. Future conditions will probably bear some relation to those in the past, and circumstances or limits that will modify future conditions can be identified. (Without this axiom, no projections are possible).

3. Some order among the variables of economic activity can be identified or assumed.

Major Parameters of Economic Growth

All major parameters used in developing long-term projections of economic development are related to the resource base of the study area and to the market area of the population it serves. Six major parameters of economic growth, listed below, are offered for consideration:

1. Population

The population of the Basin is the basic determinant of its economic growth. Individually and in groups, people are continually demanding greater quantities of water, living space, and recreational opportunities. Data needed in addition to total population numbers are figures on the unique characteristics of this population including: a) Number of households; b) Size and age of labor force; c) Degree of mobility; d) Overall age of distribution; e) Personal income; and f) The net response to future alternative employment opportunities, urbanization, and redevelopment prospects.

2. The Resource Base

The characteristics of the Basin's resource base are major determinants of the direction its future economic growth and development will take. The resource base must not be limited to physical things such as minerals, forests, and farm land, but should consider in general the probable future extent of skills and talents among the populace, the levels of education, and the like, that will affect the ability to effectively use the resource base to generate economic growth. Equally important, therefore, will be an understanding of the institutional and social arrangements that dictate the use of these resources. Aspects of land use, or perhaps more correctly "space or area use" will be of particular importance in projecting future economic activity in the Basin.

3. Gross National Product

Gross national product is a parameter of total national activity. It measures the total national output of goods and services expressed in market prices in terms of the expenditures for such goods and services by consumers and government, plus gross private and net foreign investment. Projections of GNP serve as an indicator of the probable need for specific goods and services that cannot be provided uniformly throughout the nation at one given level of cost. This indicator, therefore, serves as a guide for projecting the probable volume of goods and services that the Basin can economically contribute to the total national output requirement.

4. Gross Regional Product

Projection of a gross regional product serves as a reliable indicator of probable future development activities at the local level. Development of GRP data requires correlation of local and national historic trend data and adjustment for expected differences between future regional and national conditions. It requires consideration of the fact that few areas today operate as closed economies and the probability of diverging directions the Basin economy may take will be determined in part by worldwide economic developments.

5. Agricultural and Mining Production

Agricultural and mining activity have been major governing factors in the past economic development of the Basin. Their impact on future water quality and quantity requirements will remain extremely important. An evaluation of their future needs for land area, water, and other inputs of production depends upon adequate consideration of probable technological development, concentration of management units, changes in consumer preferences, and the competitive bargaining position of other potential users of those inputs deemed essential for agricultural and mining production. Interregional comparative advantages are not to be overlooked in the analysis.

6. Industrial Production

The demand for certain water resource oriented goods and services may be directly related to industrial activity. Where such relationships can be established, projections of industrial activity, or of value added by manufacturing, are extremely important to projecting future water quantity and quality demands. Development of certain types of industrial activity in the Basin, even though they do not exist at present, should not be considered outside of the realm of possibility without a careful analysis of the probable future bargaining position of these industries for limited supplies of desirable land and water resources. Present location disadvantages may well turn into assets in the future.

In addition to the above parameters, consideration of many detailed series of data on other aspects of economic growth, available from a number of national and local sources, is also warranted and encouraged. The growing demand for water oriented recreation and general esthetic considerations serve as examples. In all cases, however, the existence of causal relationships between a chosen indicator and the water use involved should be established.

Modifying factors, particularly the probable impact of continued future technological development, must be taken into account when projecting apparently stable past trend data. It is necessary, therefore, to assume that historic trends can be properly qualified by defining and estimating the magnitude of the modifying components and factors that will influence their projection into the future.

METHODOLOGY

The economic base survey is being carried out in four distinct steps:

1. An analysis of major indicators of recent economic development.

2. An evaluation of resource utilization.

3. An analysis of interrelationships within the 1960 economy.

4. A projection of the probable economic growth path and an indication of feasible alternative patterns of development.

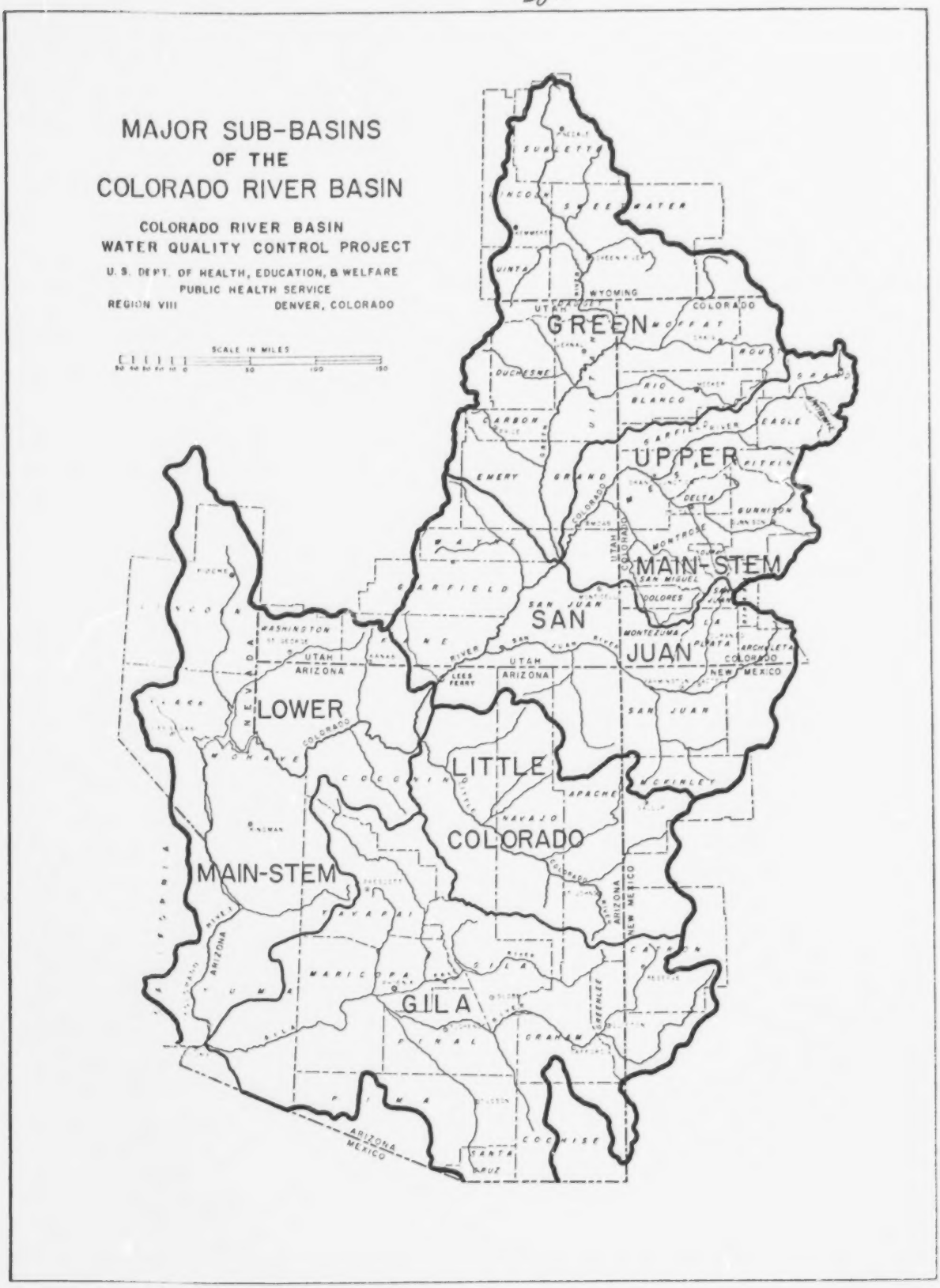
The Study Area and Levels of Abstraction Desired

The Colorado River Basin contains approximately 1/12 of the land area in the continental United States. More specifically it includes approximately 244,000 square miles. It includes parts of seven States - Arizona, California, Colorado, Nevada, New Mexico, Wyoming, and Utah. It includes all of the land area of 37 counties and portions of 40 additional counties of these States.

For study purposes, the Colorado drainage basin has been subdivided into six major sub-basins (refer to the following map). These are the Gila, Green, Little Colorado, Lower Main-Stem, San Juan, and Upper Main-Stem Sub-Basins. Estimates of land area in the Basin by states and sub-basins are shown in the following table.

The economic base survey should provide data for the actual geographic area included in the Basin in order to be of greatest use to the Project. As will be noted above, however, this area does not conform to political boundaries. Lack of available data by natural geographic areas, necessitated the use of chosen political subdivisions as the boundary lines for the study area.

Subdivisions of the overall data will be required at least at the sub-basin level but where possible data should be shown for individual counties. All pertinent tables should show this level of abstraction. Where possible, distribution of significant economic activity within the six major sub-basins should be explored and evaluated in narrative form. The nature of the natural resources and location of key segments of the economy should be indicated on maps in all cases.


MAJOR SUB-BASINS
OF THE
COLORADO RIVER BASIN
COLORADO RIVER BASIN
WATER QUALITY CONTROL PROJECT
U. S. DEPT. OF HEALTH, EDUCATION, & WELFARE
PUBLIC HEALTH SERVICE
REGION VIII
DENVER, COLORADO
SCALE IN MILES
GREEN
UPPER
MAIN-STEM
SAN
JUAN
LOWER
LITTLE
COLORADO
MAIN-STEM
GILA
WYOMING
UTAH
COLORADO
NEW MEXICO
ARIZONA
NEVADA
MEXICO

DRAINAGE AREA IN THE COLORADO RIVER BASIN BY MAJOR SUB-BASINS

Basin	State	Portion in Sub-Basin Acres	Square Miles	Percent of Sub-Basin	Percent of Basin
UPPER MAIN-STEM					
	COLORADO	14,161,584	22,127	84.8	
	UTAH	2,540,597	3,970	15.2	
	Sub-totals	16,702,181	26,097	100.0	10.7
GREEN					
	COLORADO	6,760,786	10,564	22.9	
	UTAH	10,890,741	17,017	36.8	
	WYOMING	11,913,443	18,615	40.3	
	Sub-totals	29,564,970	46,196	100.0	19.0
SAN JUAN					
	ARIZONA	4,076,728	6,370	16.8	
	COLORADO	3,748,135	5,856	15.4	
	NEW MEXICO	6,233,640	9,740	25.7	
	UTAH	10,237,916	15,997	42.1	
	Sub-totals	24,296,419	37,963	100.0	15.6
LITTLE COLORADO					
	ARIZONA	14,316,057	22,369	81.2	
	NEW MEXICO	3,312,858	5,176	18.8	
	Sub-totals	17,628,915	27,545	100.0	11.3
GILA					
	ARIZONA	31,841,231	49,752	89.9	
	NEW MEXICO	3,561,894	5,565	10.1	
	Sub-totals	35,403,125	55,317	100.0	22.7
LOWER MAIN-STEM					
	ARIZONA	17,203,840	26,881	53.2	
	CALIFORNIA	2,320,580	3,626	7.2	
	NEVADA	10,515,820	16,431	32.5	
	UTAH	2,290,434	3,579	7.1	
	Sub-totals	32,330,674	50,517	100.0	20.7
BASIN TOTALS		155,926,284	243,635	100.0	100.0

SOURCE: State and County Area Tabulations for the Colorado River Basin Basic Data Report No. 1, Public Health Service, Colorado River Basin Water Quality Control Project, January 1962, Page 7.

Work Assignment Specifications

Specific work assignments, as presented in the contract agreement with the Associated Rocky Mountain Universities, Inc., were developed for carrying out the economic base survey. These are summarized below:

1. Description of Work. The work to be accomplished consists of a separate economic base study of each of the six sub-basins in the Colorado River Basin.

2. Purpose. The purpose of the economic base survey is to provide a basic element in the development of alternative water quality management plans through the evaluation of the present and past economy of the Colorado River Basin and projections of its probable future growth path.

3. Area Involved. The Colorado River Basin, for purposes of this survey, is defined by county boundaries (see accompanying map).

4. Scope.

   A. General. The principal emphasis of the economic base survey shall be on the development of projections for the years 1965, 1980, and 2010 of economic activities that affect the quantity and quality of water in the various sub-basins. Major emphasis in the economic model will be on the major heavy water using activities including manufacturing industries that use large quantities of water, mining, agriculture, and recreation.

   B. National Economy. The initial step in the survey shall be a review of the principal features in projections of the national economy developed by the National Planning Association and of the preliminary population and labor force projections for the Colorado River Basin developed by the Sociology Staff of Colorado State University. Except as may be mutually agreed by the contracting parties, projections of the national level of population, employment, personal income and gross product shall be compatible with projections recently developed by the National Planning Association at the request of the Outdoor Recreation Resources Review Commission and accepted by the Division of Water Supply and Pollution Control, Public Health Service.

   C. Sub-Basin Economy. An inter-industry input-output model for each of the six sub-basins will be developed initially for 1960, which will serve as the base year, followed by similar tables for 1965, 1980, and 2010. These tables shall present the total economy in dollar terms. In addition, narrative material shall indicate the value added by major water using industries and the distribution of the total labor force involved in the

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various sectors of the economy. The geographic distribution of the principal forms of the economic activity shall be described and shown on maps, and their significance analyzed in terms of resource availability and market orientation. Relationship of the existing and prospective economy of each sub-basin as a whole to the overall Colorado River Basin economy and the national economy, as well as possible variations in the probable growth path of the sub-basin area, shall be identified. A separate study of the agricultural segment of each of the six sub-basin's economies will be carried out by the Economic Research Service, U. S. Department of Agriculture. Their findings will be made available to the Contractor for incorporation into the sub-basin models. The physical units of production (such as tons per day, barrels per day, etc.) related to the various heavy water using industries shall be identified where possible.

5. Basic Assumptions. Economic projections will be based on the following assumptions:

   A. Availability of water of sufficient quality to support the projected economy without being a constraint to economic growth.

   B. During the projection time period, 1960 to 2010, the Nation and the Colorado River Basin will experience a relatively high level of employment, a stable general price level, average weather, and a continuation of the current relative needs of the civilian economy and national defense which will be realized by continued development and adoption of technology consistent with a rapidly growing population.

   C. National production and product requirements will tend toward an equilibrium under reasonably competitive conditions, and the Colorado River Basin will share in the gross national product to the full extent of any competitive advantages for producing specific products and services that it may possess.

   D. Probable future, social, legal, and institutional changes in the Basin area can be estimated. This will hold particularly in how these conditions will affect water use.

6. Projections Required.

   A. Projections shall be made for a period of 50 years commencing with 1960 as the base year. In addition to the probable 2010 situation, the projections shall identify the probable 1965 and 1980 conditions. An analysis and discussion of possible variations in the growth path shall also be presented. Projections will be related to the value of the dollar in 1960.

B. The study results shall include a summary of projections for the nation for the following items: gross product, personal income, population, labor force and employment by major industry categories. These in turn shall be related to expected conditions in each of the six sub-basins. Projections shall include population, personal income, labor force, employment by major industry categories and gross sub-basin product. To the extent practicable, population data and projections of same shall be sub-divided into urban, rural farm, and rural non-farm categories. In addition to the general projections listed above, projections for the major sectors of the economy shall be developed so that an inter-industry input-output table can be provided. Projections of production shall be expressed in dollar values as well as in physical quantities where possible. Input-output coefficients, and corresponding dollar values, shall be provided for the following sectors of the economy:

1. Agriculture
   a. Irrigated farms
   b. Nonirrigated farms
2. Manufacturing
   a. Pulp and paper
   b. Chemicals
   c. Petroleum and coal products
   d. Food and kindred products
   e. Lumber, furniture and wood products
   f. Primary metals
   g. All other manufacturing
3. Minerals: Mining and Primary Processing
   a. Uranium
   b. Oil and Gas
   c. All other
4. Retail Trade (as an indicator of recreation activity)
   a. Gas and auto
   b. Restaurants, etc.
   c. Lodging
   d. All other
5. Other Commercial Activity
   a. Wholesale trade
   b. All services
   c. Transportation
   d. Utilities
   e. Rentals and Finance
   f. Building and other contractors
6. Government activity
   a. Local
   b. State and Federal
7. Household
   a. Wages
   b. Profit/losses, other

8. Import-Export Components
   a. Among sub-basins
   b. Between Colorado Basin and U. S.

Time Schedule

Overall Project plans call for completion of the economic base survey by February 1966. This must necessarily be a firm commitment because the development of the water quality management program cannot precede the completion of the economic base survey. A tentative time schedule for the economic base survey follows:

May - June, 1961	Precontracting discussions with prospective contracting organizations.
June, 1961	Preparation of detailed specifications and cost estimates.
August, 1961	Completion of initial contract negotiations.
September 1961 - December 1962 (16 months.)	Collection of basic data relative to past and present economic development in the Basin by major types of economic activity; provision of basic data for use in a pilot study in one of the smaller tributary drainage areas.
August, 1962	Initiation of the Green River Sub-Basin study.
August, 1963	Completion of the Green River Sub-Basin report.
December, 1963	Completion of the Upper Main-Stem Sub-Basin report.
August, 1964	Completion of the San Juan and Little Colorado Sub-Basin reports.
August, 1965	Completion of the Gila and Lower Main-Stem Sub-Basin reports.
December, 1965	Completion of a final report covering the overall economic base survey of the Colorado River Basin.
February, 1966	Completion of revisions and last minute details in regard to the economic base survey effort.

SUMMARY

This report provides a discussion of the role of an economic base survey in the overall activities of the Colorado River Basin Water Quality Control Project. It supersedes a previous report on this subject which was originally issued in May 1961; subsequent revisions may be needed if major elements of the economic base survey change in the future.